Surface plasmon tunable filter and spectrometer-on-a-chip

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Surface plasmon tunable filter is a new technology invented in Jet Propulsion Lab. When a white light is incident on a metal/EO material/metal structure, in certain condition, surface plasmon waves can be excited at one metal/EO material interface; those photons in surface plasmon resonance wavelength range will be converted into the energy of free electrons in the metal than coupled into the other metal film, and re-radiate out the color light. This sill-face plasmon resonance depends on the dielectric constants of both the metal and the EO material. If a voltage is added on the EO material to change its dielectric constant, the surface plasmon resonance spectrum can be shifted from one wavelength to the other, and this is a tunable filter.

Surface plasmon tunable filter is a light weight, low power device, it can be integrated with a solid state image sensor to form a spectrometer-on-a-chip.